

Strawberry Run Stream Restoration

Ft. Williams Park

North of Duke Street between Donelson St.
and Ft. Williams Parkway



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Stream restoration

is one way that developed areas can increase their water quality. “Stream restoration” is a very broad term that can be as little as removing blockages within systems (a destructive log jam or human generated trash) to redesigning and restructuring a stream within its floodplain. The basic goal of almost all stream restorations is to improve the health of the system. The benefits are many, and which benefits result are largely dependent upon the methods or activities that lead to restoration. Among the benefits are increased dissolved oxygen within the water (better for fish and other critters), increased habitat for aquatic organisms, decreased erosion and thus reduced sediment transport, increased water quality, decreased maintenance activities and more efficient flow through the system. The City of Alexandria is fortunate in that stream restoration is one of the tools available through the Environmental Management Ordinance (Article XIII of the Zoning Ordinance) to comply with the water quality performance criteria set by Section 13-109(E)(5).

City streams suffer increased flows with elevated velocities when urbanization occurs. Erosion of the banks and beds are a result.



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Ft. Williams Park is located north of Duke Street between Fort Williams Parkway and Donelson Street. Strawberry Run is an urban stream that runs north to south through Ft. Williams Park, south past Duke Street, into Lake Cook and eventually into Cameron Run.



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Strawberry Run suffers from high velocities as evidenced by the down-cutting creating the vertical side banks and depressed stream bed. There is also a considerable amount of concrete and other debris in the stream that serves to negatively deflect flows creating erosive forces.



2005

Looking upstream toward the bridge



2004

Looking downstream from the bridge



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The bridge worked to pinch off the stream. The banks eroded and the stability of the bridge was threatened. While it doesn't look spectacular in this picture, it was decided that this bridge could be a signature piece in the restoration.



Looking upstream toward bridge (2005)



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Calvert Homes bought several lots surrounding the lower portion of Taft Avenue adjacent to the stream. The City was very excited when they choose to use stream restoration as their method of improving water quality. The stream restoration served to stabilize the banks

preventing eroded sediment from flowing down the stream and being deposited elsewhere. Since phosphorous attaches to sediment, reducing the amount of sediment in our streams means less phosphorous will get into the Potomac River and the Chesapeake Bay. The plan was approved by Planning Commission on February 6, 2007 but construction did not began until February of 2010.



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Here are some examples of degradation in the Strawberry Run stream channel. The stream restoration provided a marvelous transformation in this small stream valley and has made Ft. Williams Park a functional, beautiful park for animals, humans and birds to enjoy.



On the right in this picture you see a tree where the dirt under the root system has been eroded away (undercut). Eventually the tree falls into the stream because there is no subsurface to hold it upright.



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This is another example of the erosive forces of water undercutting the vegetation that usually anchors the stream bank in place. What is left is dangling roots.



Here you see some examples of invasive species that need to be removed. Note the Bamboo and English Ivy climbing the trees. Ivy will eventually kill this tree and the bamboo competes with other native plants (trees and bushes) that would otherwise provide habitat for riparian animals and birds.



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Restoration Goals

The philosophy of this particular stream restoration was to reconnect the stream with the floodplain and attempt to maintain the sinuosity (the amount of curve in the stream) so as create as great of variety of habitat within the stream and riparian area as possible. This involved adding cross vanes to roll the water away from the banks centering the flow, control the change in hydraulic grade line, and prevent downcutting of the channel. J-hooks were added to direct erosive flows away from the streambank, center the flow and provide scour pools for fish habitat. Other components of natural channel employed were using jute matting to stabilize toe and bank slopes – anchored with a variety of pins and willow stakes at the toe. Willow stakes serve to anchor the matting but moreover to provide a network of natural root systems to anchor the banks in place against erosive flows.

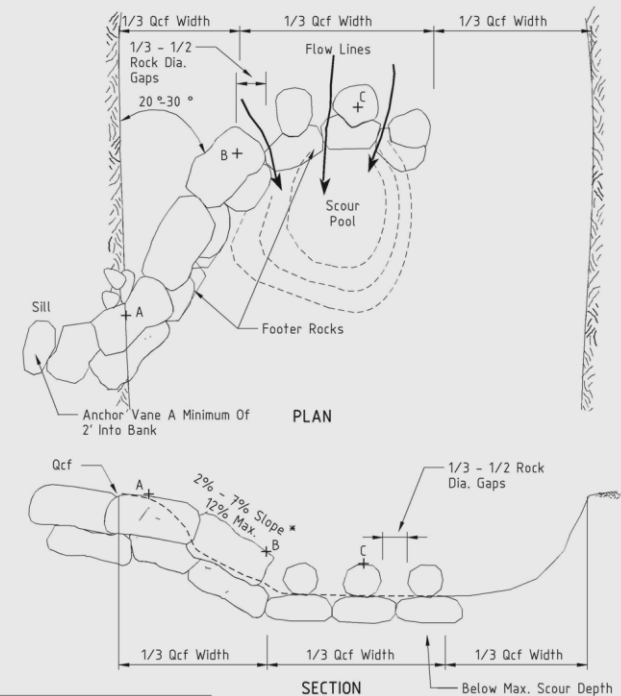


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J-Hook



The Virginia Stream Restoration & Stabilization Best Management Practices Guide
DETAIL 4.2(a): J-HOOK VANES



* Designer to Provide Offset and Elevation for Points A,B,C

Seal All Structures per Fig. 3.2 For Streams with a Sand portion in the bed.

Section & Plan Views Adapted From Rosgen (2001)

FLOW DEFLECTION CONCENTRATION GUIDELINES

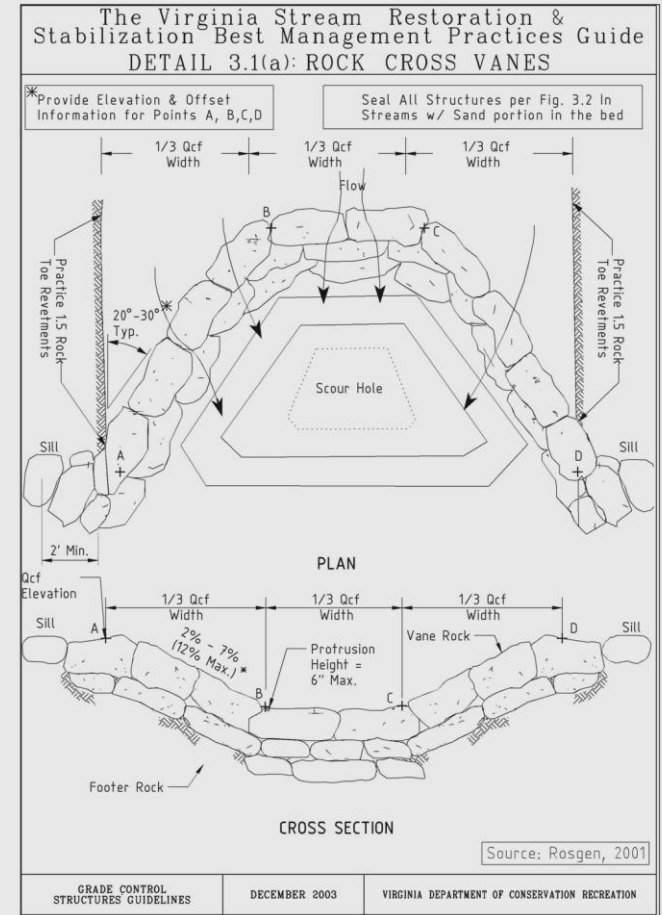
DECEMBER 2003

VIRGINIA DEPARTMENT OF CONSERVATION RECREATION



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Cross Vane



Stream restoration is a team effort among professions with a broad range of expertise. Many say it is an art and it appears that the Williamsburg Environmental Group, Inc. (WEG) and Total Development Solutions (TDS) are artists. WEG conducted the necessary hydraulic/hydrologic modeling that incorporated bankfull width, depth, channel and bank slope, and flow velocity to identify the most appropriate restoration technique. They assembled detailed construction documents that incorporated all facets of the design process including local, state, and federal agency requirements. They also assembled bid packages that included contract specifications, bid schedules, quantities, and design information, and works closely with the selected contractor (TDS, LLC) to ensure that the plans were built to specification. TDS worked diligently to follow the guidance of WEG and the implementation of a good plan was the result.

See <http://www.wegnet.com/index.htm> and
<http://www.totaldevelopmentsolutions.com>



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One needs to keep in mind that stream restoration is a little bit like the Good, the Bad, and the Ugly – except perhaps not in that order. In it's degraded state the stream is the “BAD”. The restoration process itself is probably the “UGLY”. In order to restore the stream trees must be removed to lay back the banks so the stream can be reconnected to it's floodplain. Trees also frequently need to be removed so that large equipment can access the stream. Most of the time this saddens the uninitiated public, but it is a necessity of life in order to get to the “Good”, the completed stream restoration and revegetation.

For Example: The Bridge



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The Bad



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The UGLY



Looking Downstream

Bridge removed, trees cut and pulled, vegetation scraped.



Looking Downstream

Footers in place. Adding more boulders.



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The UGLY



The art of setting the boulders in just the right location and elevation.



That's right, just a little more inward!



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The UGLY



Check the plan one more time.



Checking centerline and elevations



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Getting close to GOOD



Left bank looking upstream



Opposite Bank



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GOOD



Bridge just needs a few repairs. You try lifting a bridge in one piece and not breaking anything.



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Really GOOD



Looking downstream after bridge rails were repaired, grasses begin to grow, after landscaping and the placement of the live stakes (willows).

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Some Before and After Shots



Looking upstream



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Yes, this really
is the same
vantage point!



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And in conclusion



For further question regarding the Strawberry Run Stream restoration contact Claudia Hamblin-Katnik, City of Alexandria Watershed Program Director at 703 746-4068 or Claudia.Hamblin-Katnik@alexandriava.gov

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